

## WE CLAIM:

1. A method of treating an area of interest, the method comprising:
  - delivering a first therapeutic application to an area of interest of a patient based on an initial prescription;
  - automatically monitoring one or more factors, exclusive of a position of said area of interest, that could affect the effectiveness of said initial prescription;
  - automatically modifying said initial prescription based on said monitoring one or more factors; and
  - delivering a second therapeutic application to said area of interest of said patient based on said automatically modifying said initial prescription.
2. The method of claim 1, wherein said area of interest includes a tumor.
3. The method of claim 1, wherein said first therapeutic application comprises a dose of radiation delivered to said area of interest.
4. The method of claim 1, wherein said one or more factors comprise anatomical and physiological variations within said area of interest.

5. The method of claim 1, wherein said one or more factors comprise a stage of disease within said area of interest.
6. The method of claim 1, wherein said one or more factors comprises a stage of treatment of said area of interest.
7. The method of claim 1, wherein said monitoring comprises imaging said area of interest.
8. The method of claim 1, wherein said monitoring comprises laboratory testing of said patient.
9. The method of claim 1, wherein said monitoring comprises physiological measurement of said patient.
10. The method of claim 1, wherein said monitoring comprises clinical observation of said patient.
11. The method of claim 1, wherein said one or more factors comprises changes in applying said first and second therapeutic applications due to unscheduled breaks in said method of treatment.

12. The method of claim 1, wherein said automatically monitoring is performed during said delivering of said first therapeutic application.

13. The method of claim 1, wherein said automatically monitoring is performed after said delivering said first therapeutic application and prior to said delivering said second therapeutic application.

14. The method of claim 7, wherein said imaging comprises taking a magnetic resonance image of said area of interest.

15. The method of claim 7, wherein said imaging comprises taking a CT image of said area of interest.

16. The method of claim 1, further comprising defining said first therapeutic by defining clinical intent, goals and constraints of said method of treating said area of interest.

17. A method of active therapy redefinition, comprising:  
performing a diagnosis process on a patient;  
automatically delivering a first dose of therapeutic radiation to an area of interest of said patient based on said diagnosis process;  
automatically monitoring one or more factors, exclusive of a position of said area of interest, that could affect the effectiveness of said

automatically delivering said first dose of therapeutic radiation to said area of interest of said patient based on said diagnosis process;

automatically calculating a second dose of therapeutic radiation based on said automatically monitoring one or more factors; and

automatically delivering said second dose of therapeutic radiation to said area of interest based on said automatically calculating.

18. The method of claim 17, wherein said diagnosis process comprises analyzing relevant information regarding a disease state and a condition of said patient.

19. The method of claim 17, further comprising generating at least one image set relevant to said area of interest of said patient and applying said at least one image set to said performing said diagnosis process.

20. The method of claim 17, wherein said performing said diagnosis process comprises performing decisions concerning the type and extent of disease within said area of interest.

21. The method of claim 19, further comprising :  
automatically performing a therapy prescription process that comprises said automatically calculating said second dose of therapeutic radiation ;

wherein said performing said diagnosis process comprises performing decisions concerning the type and extent of disease within said area of interest; and

wherein value is added to said at least one image set and said value added to said at least one image set is used during performing said therapy prescription process.

22. The method of claim 21, wherein said automatically performing said therapy prescription process comprises:

setting goals and constraints;

assigning goals and constraints; and

assessing goals and constraints for said therapy prescription process.

23. The method of claim 21, further comprising generating a reference image set from said value added at least one image set, wherein said reference image represents a static image of said area of interest prior to any treatment of said area of interest.

24. The method of claim 22, wherein said goals and constraints are selected from the group consisting of : total dose, dose per fraction, a fractionation schedule, identification of whether treatment is complete, definition of anatomical structures associated with a disease as well as organs that are not to be unduly irradiated and definition of an anatomical

point to be irradiated to a required minimum dose.

25. The method of claim 17, wherein said automatically monitoring comprises laboratory testing of said patient.

26. The method of claim 17, wherein said automatically monitoring comprises physiological measurement of said patient.

27. The method of claim 17, wherein said automatically monitoring comprises clinical observation of said patient.

28. The method of claim 23, further comprising :  
automatically generating a reference plan based on said reference image set, wherein said reference plan indicates what is dosimetrically expected for a first fraction of radiation and a total course of radiation delivery to said area of interest ; and  
automatically generating a positional image set of said patient that includes information of an actual treatment isocenter.

29. The method of claim 28, further comprising assigning goals and constraints to generate said modified therapy based on said positional image set.

30. The method of claim 28, further comprising:

comparing said positional image set with said reference image set; and  
automatically modifying a position of said patient based on said comparing.

31. The method of claim 28, further comprising:

automatically determining a positional plan from said positional image set, wherein said positional plan defines dose volume statistics;

automatically comparing said positional plan with said reference plan so as to automatically generate a modified reference plan.